CLAIMS

We claim:

1. (Currently Amended) A monolithic integrated 3-axis accelerometer chip, comprising:

a single crystal substrate, said single crystal substrate including at least one single crystal membrane layer portion ;[[, and]]

a single ~~sensor~~ microstructure formed using said membrane layer, said sensor microstructure capacitively sensing and providing acceleration data for [[in]] all three orthogonal axes, wherein said sensor microstructure comprises a plurality of comb finger sets including at least one comb finger set for motion sensing in each of said three orthogonal axes, said comb finger sets comprising a plurality of comb fingers, said comb finger sets for each of said three orthogonal axes include ~~disposed at least in part on~~ said membrane layer, and

at least one electronic circuit formed on said single crystal substrate for processing data said acceleration data.

2. (Cancelled)

3. (Currently Amended) The accelerometer of claim 1, wherein said electronic circuit [[includes]] comprises at least one selected from the group consisting of a pre-amplifier, a demodulator, a low-pass filter, an A/D converter and a DSP.

4. (Cancelled)

5. (Previously Presented) The accelerometer of claim 1, wherein said accelerometer includes a proof mass and at least one flexure, at least a portion of said comb fingers being disposed on said proof mass, said flexure mechanically connecting said proof mass and said membrane layer.

6. (Original) The accelerometer of claim 5, wherein said plurality of comb finger sets provides fully differential capacitive bridges for both x-sensing and y-sensing.

7. (Original) The accelerometer of claim 1, wherein said plurality of comb finger sets comprise a metal/dielectric composite thin film layer stack disposed on said membrane layer.

8. (Original) The accelerometer of claim 7, wherein said membrane layer beneath respective ~~ones~~ sides of said comb finger sets are electrically isolated from one another.

9. (Currently Amended) The accelerometer of claim 1, wherein said accelerometer includes a rigid frame disposed between structure for x-y sensing and structure for z-sensing. ~~for decoupling x-y sensing from z-sensing.~~

10. (Currently Amended) The accelerometer of claim 9, wherein said structure for z-sensing is disposed inside said rigid frame, wherein said structure for z-sensing includes a proof mass disposed inside said rigid frame by at least one element for decoupling z-sensing from x-y sensing, wherein said frame ~~together with~~ plus said z-sensing structure is an effective proof mass for said structure for x-y sensing.

11. (Currently Amended) The accelerometer of claim 9, wherein said structure for x-y sensing is disposed inside said frame, wherein said structure for x-y sensing includes a proof mass disposed inside said rigid frame by at least one element for decoupling x-y sensing from z-sensing, wherein said frame plus said x-y sensing structure is an effective proof mass for said z-sensing structure.

12. (Currently Amended) The accelerometer of claim 1, wherein ~~said accelerometer~~ at least one of said comb finger sets for motion sensing includes structure for differential capacitive sensing in at least one of said three orthogonal axes.

13. (Currently Amended) The accelerometer of claim 1, wherein said comb finger sets for motion sensing ~~accelerometer~~ include[[s]] structure for differential capacitive sensing in all three of said orthogonal axes.

14. (Original) The accelerometer of claim 12, wherein said structure for differential capacitive sensing comprises a rotor disposed between two stators, said rotors and said stators formed from a metal/dielectric stack disposed on said membrane layer.

15. (Original) The accelerometer of claim 14, wherein said metal in said metal/dielectric stack portions are electrically isolated from said membrane layer.

16. (Previously Presented) The accelerometer of claim 14, wherein said metal in said metal/dielectric stacks is electrically connected to said membrane layer, said membrane layer comprising at least one electrode of said structure for differential capacitive sensing.

17. (Original) The accelerometer of claim 14, wherein said metal in said metal/dielectric stack is disposed in sidewalls of said metal/dielectric stack.

18. (Original) The accelerometer of claim 14, wherein a cross sectional area of said membrane layer is less than a cross sectional area of said metal/dielectric stack.

19. (Previously Presented) The accelerometer of claim 18, wherein said cross sectional area of said membrane layer is less than a cross sectional area of said metal/dielectric stack for said comb fingers including comb fingers which provide z-axis sensing.

20. (Original) The accelerometer of claim 1, wherein said membrane layer is less than 100 μm thick.